

REVIEW

Forensic Evidence in Canada

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Forensic Evidence in Canada, by G.M. Chayko and E.D. Gulliver (editors) (Second Edition)
Aurora: Canada Law Books Inc. 1999, xxv + 626 pages.

IT WAS A DELIGHT TO READ a book on forensic evidence that is specifically Canadian. Currently, there are several books on forensic evidence on the market, however they focus primarily on U.S. or British evidence and law. Although the evidence itself may remain the same, its collection and handling from the crime scene to the court room can be quite different in Canada. The police, coroner/medical examiner and legal system, although bearing similarities to both British and U.S. systems, are uniquely Canadian. This book not only covers a wide variety of forensic evidence from the Canadian standpoint, it points out differences between our systems and those of Britain and the U.S. Furthermore, the book is liberally illustrated with Canadian Case Histories for students of this field to follow.

The book is edited by Gary M. Chayko, a specialist in criminal law, and Edward D. Gulliver, assistant crown attorney in Ontario and forensic science instructor at the Faculty of Law, University of Ottawa. Chayko and Gulliver have assembled an excellent group of Canadian forensic scientists, from both private and government spheres, to discuss each area. The purpose of the book is to examine the relationship between the forensic science expert and the law in Canada. The book aims to help Canadian lawyers find a qualified expert; effectively using forensic evidence in court, and to aid the scientific community and police investigators in better understanding forensic evidence as it relates to the judicial process.

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The first five chapters examine forensic evidence and the courtroom. The first chapter is a general overview of forensic science. The second and third chapters look at opinion evidence and the expert witness, the fourth chapter looks at the trial itself, and the fifth briefly covers obtaining and testing the evidence. The authors refer to science and law as uneasy partners. This is a very true statement as the expectations of the scientist and that of the courts are often very different. They discuss the points and objectives that differ between the scientist and the law, such as the differences between scientific proof involving extensive empirical evidence and legal proof. An extensive chapter describes the difference between a lay and expert witness, choosing and qualifying an expert, and preparing and cross-examining an expert. Canadian cases are cited throughout and the chapter is followed by suggestions for further reading. A section on locating experts lists a number of forensic societies although at least one is incorrect (CIS is actually in Ontario, not Alberta).

This is followed by a chapter on the trial itself the trial process, and real and demonstrative evidence. A brief chapter looks at sources of forensic evidence, methods of collection, continuity. These chapters will be of value to scientists entering the field of forensics and testifying in court for the first time in understanding the legal processes, and also to lawyers who utilise expert witnesses. The different objectives and methods of science and law need to be understood by both parties in order for clear, impartial evidence to be given. It is hoped they may also help lawyers to understand how to prepare expert witnesses, as most scientists have little to no experience with the law until called to give evidence and frequently find the experience quite unpleasant. Proper preparation and understanding of the processes ahead of time can make the experience much more fruitful and less daunting.

The following 16 chapters are contributed by a variety of forensic scientists. The first is a chapter on investigative interviewing by John Turtle and Kerry Watkins. Dr. Turtle is a psychology professor researching areas of eye-witness testimony, and Mr. Watkins is a Toronto police officer with experience in investigative interviewing. The chapter is aimed at assisting counsel in dealing with the use of witness and accused statements and should assist them in finding areas to challenge, as well as weaknesses in their own cases. This chapter looks at various interview techniques and explains the advantages and disadvantages each, including a special section on collecting and analysing children's statements. It presents examples of good and bad interview techniques and discusses the drawbacks of certain methods. As with most of the following chapters, it concludes with a detailed glossary, and although well referenced in the text, also supplies a list of suggested further readings.

A chapter on eye-witness testimony by Dr. Rod Lindsay, a psychology professor and expert in eye-witness testimony, nicely compliments the investigative interviewing chapter, with some overlap. However, the two chapters are separated by chapters on unrelated topics, alcohol and crime scenes. The author

discusses the scientific and historic background of eye-witnesses, memory for events and memory for faces. He then discusses the scientific evidence in terms of estimator and system variables and their impact on memory for events and for people. The review discusses various research studies on such things as: question content and style; recall versus recognition; and, factors which effect recognition such as race and age, narrative versus interrogative questions, mug shots and line-ups. The chapter is thoroughly illustrated with Canadian cases, and argues many of the contentious aspects of eye-witness testimony. (It will be useful for counsel to troubleshoot potential problems in their own cases as well as for use in cross-examinations.)

The book then goes on to cover specific types of forensic evidence. The first of these is an analysis of alcohol. The chapter is written by Brian Hodgson, Chief Scientist, Alcohol, at the R.C.M.P. entral forensic Lab in Ottawa. This chapter looks at breath testing for alcohol, both roadside screening and evidential testing. Mr. Hodgson details how the tests should be made, what calibrations are required, and discusses factors that may impact the results. He then discusses blood analysis for alcohol and the pharmacokinetics of alcohol. This chapter should provide counsel with a basic understanding of how the charge of intoxication was made, and the laws of biology and physics that underlie its absorption, distribution and elimination, as well as some of the factors that may effect results.

Dr. David King, a forensic pathologist, contributes a chapter on the investigation of death. This chapter looks at the death itself and the resulting medical analysis . This chapter begins with an extremely useful description of the difference between a medical examiner and a coroner in Canada. This is particularly pertinent as the roles differ between different provinces and countries. Also, a clear explanation is given between the qualifications of a pathologist and a forensic pathologist, a distinction that is not always clear but is very important when qualifying an expert. Dr. King advocates a team approach to the investigation of death that is extremely important in all aspects of a death investigation. The author briefly covers aspects of the identification of the victim, both tentative and positive, and looks at the medical parameters used to determine time since death—an always controversial issue. Dr. King examines the usual medical parameters of algor, rigor and livor mortis, together with decomposition, mummification and saponification. He further looks at the variables that can impact time since death determinations using these techniques. He briefly mentions other techniques that are available, such as botanical and entomological evidence, but gives very few direct references. In fact, the chapter contains few citations, although a few cases are mentioned. A general autopsy is described together with a post-mortem examination report. An excellent section on the strengths and weaknesses of forensic pathology evidence is given that will be useful to counsel when choosing an expert and when doing cross-examining. Additional reading is suggested at the end of the chapter.

Separate chapters are devoted to blood and bodily substances and DNA. DNA has taken over much of forensic biology, but there is still other important information that can be derived from body fluids. Dr. Cecilia Hageman, a forensic scientist in the Biology Section at the Ontario Centre of Forensic Sciences, and Ms. Kimberley Johnston, Assistant Head, Biology Section, Ontario Centre of Forensic Sciences, co-wrote the chapter on blood and bodily substances. The chapter briefly covers the body substances that might be analysed in the biology section and then describes the presumptive and confirmatory tests for each substance. They discuss the basic biochemistry involved and then briefly describe the principles involved in the main techniques used in forensic serology. The chapter is well referenced and has an excellent glossary.

Trace evidence is covered in only one chapter, and only one type of trace evidence, hair, is discussed at length. However, trace evidence consists of a vast group of investigative material and it would have been valuable to look at some of these as well, such as fibres, glass, paint. James Crocker, the author of this chapter, is a member of the biology section at the Ontario Centre of Forensic Sciences. The chapter begins with a discussion of the type of training and expertise one should expect from a hair examiner and the scientific foundation for hair examination, including the inter and intra-variation in hairs between people and areas of the body. The examination protocol to minimize contamination is clearly explained and the types of information that a hair examination could expect to yield is given. A detailed explanation of the morphology of all parts of the hair is presented, followed by a discussion of the Guy Paul Morin case, and several studies on probabilities. The author then goes on to discuss the strengths and weaknesses of the evidence and potential problems for prosecution and defence. The chapter is concluded with an extensive list of further readings for hair examination and other types of trace evidence.

DNA evidence is covered by Dr. John Wayne, an Associate Professor of Pathology And Molecular Medicine at McMaster University and specialist in forensic DNA typing. The chapter provides an introduction to DNA and the various typing methods used by forensic labs in Canada, with an emphasis on the tremendous changes that have occurred over the past few years. The author begins with advice on the level of expertise required, followed by a summary of both nuclear and mitochondrial DNA, including: biological basis for individuality; the structure of DNA; and, the fundamentals of genetics and DNA typing. Examples are given to illustrate how probabilities are calculated and then a detailed examination of RFLP¹ and PCR² techniques is given, including problems that may arise in analysis and interpretation, and how they can be detected and overcome. This is followed by a discussion of validation and profi-

¹ Restriction Fragment Length Polymorphism.

² Polymerase Chain Reaction.

ciency tests, standards and accreditation. The chapter is concluded with a discussion of common case scenarios, and prosecution and defence strategies for presenting and arguing DNA evidence.

Dr. S. Kogon contributes the chapter on dental evidence and is director of the School of Dentistry, University of Western Ontario. He begins by describing what expertise should be expected of a forensic dentist dealing with the different aspects of forensic dentistry and where to find such an expert. Identification of a decedent through dental evidence is described and critiqued and a brief review is given of age, sex and race determinations. Bite mark analysis is discussed, but many older references are used and there is little mention of some of the new areas in forensic odontology, such as the retrieval of DNA from saliva in a bite-mark.

Two chapters are devoted to bloodstain pattern interpretation. The first is contributed by Herb MacDonell, Director of the Laboratory of Forensic Science and Professor of Criminalistics at Corning Community College, New York, and Catherine Cox, an attorney in Philadelphia. The chapter looks at the characteristics of blood that effect its pattern analysis and goes into a detailed explanation of bloodstain pattern dynamics and interpretation. The second chapter looks at the more recent analysis of impact bloodstain patterns with a computer and is contributed by Dr. Alfred Carter, Professor Emeritus of Physics from Carleton University and the creator of the BackTrack computer program for bloodstain analysis, and Sgt. Pat Laturnus, an R.C.M.P. officer and forensic identification specialist. The computer analysis of bloodstain patterns is described together with new digital procedures.

Inspector Herb Durand, Officer in charge of the Identification section, Ottawa Carleton Regional Police, contributes the chapter on fingerprints. This chapter explains the basis of a print, how to collect and develop a print, including a variety of different techniques for different circumstances and then examines at the identification and analysis process.

Firearms and ballistics are presented by John Matthews, a forensic consultant specialising in firearms, tool marks and explosives. The chapter covers expert qualifications then briefly describes firearms examinations, gunshot residue, serial number restoration, and pill ballistics. The chapter is concluded with an excellent illustrated glossary.

Brian Lindblom is an R.C.M.P.-trained private documents and counterfeit examiner and contributes an excellent chapter on document examinations. He begins by clearly outlining the qualifications that should be expected of a documents examiner. This is followed by an easily understandable explanation of what makes handwriting unique, what an examiner is looking for and the range of opinions that might be offered. The author then goes on to explain comparisons of mechanically and electronically produced impressions, such as typewriters and printers, how an examiner dates documents, and analyses al-

tered or damaged documents and counterfeits. The chapter is concluded with suggested areas for counsel to challenge this evidence.

Robert MacDonald, chartered accountant and founding principal of the leading forensic and investigative accounting firm in Canada, and Robert Gerden, a corporate investigator, contribute a chapter on forensic accounting. The chapter provides an explanation of the types of crimes that forensic accountants can assist in, and is well illustrated with case studies as examples of each point. This is followed by a critique of the qualifications that should be looked for in a forensic accountant, including tips and traps for the lawyer when retaining a forensic accountant. The types of crime in which forensic accounting might assist are described and the methods that would be used are discussed.

Forensic engineering is presented by Kenneth Cunliffe, a consultant at the Centre of Forensic Sciences, who wrote on this subject for the first edition of this book, but has since died, and Eric Krueger the first forensic engineer at the Ontario Centre of Forensic Sciences. The chapter begins with a description of what a forensic engineer is, followed by a description of the types of situations in which a forensic engineer can assist the courts, including case examples.

In general, the book is an excellent resource for lawyers seeking to learn more about a particular forensic science and clearly emphasises the Canadian issues and cases. Each chapter clearly explains the qualifications expected of an expert in that field and how to locate such an expert. It is followed by a good explanation of the subject, its strengths and weaknesses, and is concluded with a glossary of essential terms. The only negative point is that only a limited number of forensic sciences are covered. It is obvious that no book can cover everything, but there are several areas that could have usefully been covered and critiqued, such as: drug analysis; polygraph analysis; other trace element analysis such as paint, glass, explosives, and arson; anthropology; entomology; and psychological profiling. Perhaps a second volume is called for!